

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A process for the production of hydrogen, comprising the steps of:

 (i) providing a photosynthetic microorganism having electron transfer capability through a photosynthetic "light" reaction pathway and through a respiratory electron transfer chain involving an oxidative phosphorylation pathway, and which expresses a hydrogenase, wherein regulation of the oxidative phosphorylation pathway is disrupted with the result that electron flow along the respiratory electron transfer chain toward cytochrome oxidase (complex IV) is reduced;

 (ii) culturing the microorganism under microoxic and illuminated conditions; and

 (iii) collecting evolved hydrogen.
2. (Original) A process as claimed in claim 1, wherein the microorganism is cultured in an acetate-containing medium.
3. (Currently Amended) A process as claimed in claim 1, wherein carbon dioxide is ~~the~~ a carbon source.
4. (Currently Amended) A process as claimed in ~~any one of claims claim 1 to 3~~, wherein illumination is continued for up to 120 hours.
5. (Currently Amended) A process as claimed in ~~any one of claims claim 1 to 4~~ wherein illumination is by solar radiation.

6. (Currently Amended) A process as claimed in ~~any one of claims~~ claim 1 to 4 wherein illumination is from an artificial light source.
7. (Currently Amended) A process as claimed in ~~either one of claims~~ claim 5 or 6, wherein illumination is at a light intensity between 15 and 3100 $\mu\text{mol m}^{-2} \text{s}^{-1}$.
8. (Currently Amended) A process as claimed in ~~any one of claims~~ claim 1 to 7, further comprising adding an uncoupler of ATP synthase from the photosynthetic electron transport chain.
9. (Currently Amended) A process as claimed in claim 8 wherein the uncoupler is selected from the group consisting of Carbonyl cyanide 3-chloro-phenylhydrazone (CCCP), 1,3-Dicyclohexylcarbodiimide (DCC), Ammonium chloride, Venturicidin, carbonyl cyanide p-trifluoromethoxyphenylhydrazone (FCCP), 2,4-dinitrophenol, Gramicidin, and Nigericin, and combinations thereof.
10. (Currently Amended) A process as claimed in ~~any one of claims~~ claim 1 to 9 wherein activity of a mitochondrial transcription factor which regulates the respiratory electron transfer chain is reduced or eliminated.
11. (Original) A process as claimed in claim 10, wherein the mitochondrial transcription factor is MOC1.
12. (Currently Amended) A process as claimed in claim 10 ~~or 11~~ wherein activity of the mitochondrial transcription factor is reduced or eliminated through introduction of an antisense molecule, using RNAi, through introduction of an inactivating mutation, or through introduction of introducing an inhibitor of the mitochondrial transcription factor, or a combination thereof.
13. (Currently Amended) A process as claimed in ~~any one of claims~~ claim 1 to 12 wherein cytochrome oxidase (complex IV) is downregulated.
14. (Original) A process as claimed in claim 13 wherein levels of the *coxI* transcript are reduced relative to *nad2*.

15. (Currently Amended) A process as claimed in ~~any one of claims~~ claim 1 to 14 wherein cyclic electron transport in the chloroplast is inhibited.
16. (Currently Amended) A process as claimed in ~~any one of claims~~ claim 1 to 14, wherein the microorganism is an alga or cyanobacterium.
17. (Original) A process as claimed in claim 16 wherein the alga is one of the green algae.
18. (Currently Amended) A process as claimed in claim 16 wherein the alga is selected from the group consisting of algae of *Synechococcus sp.*, ~~the~~ *Chlorococcales sp.*, ~~and~~ *Volvocales sp.*, ~~especially those of~~ *Chlamydomonas spp.*, *Scenedesmus spp.*, ~~and~~ *Chlorococcum spp.*, *Chlorella spp.*, *Platymonas spp.*, *Trichomonas spp.*, and combinations thereof.
19. (Original) A process as claimed in claim 18 wherein the alga is from the Order *Volvocales*.
20. (Original) A process as claimed in claim 19 wherein the alga is of *Chlamydomonas spp.*
21. (Original) A process as claimed in claim 20, wherein the alga is *Chlamydomonas reinhardtii*.
22. (Currently Amended) A process as claimed in claim 21, wherein the alga is *Chlamydomonas reinhardtii* *Stm6* deposited with the Culture Collection of Algae and Protozoa (CCAP) on 1 July 2003 under accession number 11/129 }.
23. (Canceled)
24. (Canceled)
25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Original) *Chlamydomonas reinhardtii* *Stm6* deposited with the Culture Collection of Algae and Protozoa (CCAP) on 1 July 2003 under CCAP accession number 11/129.

29. (New) A process as claimed in claim 6, wherein illumination is at a light intensity between 15 and 3100 $\mu\text{mol m}^{-2}\text{s}^{-1}$.